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WATER QUALITY SURVEY IN THE NORTH BRANCH - POTOMAC RIVER BETWEEN CUMBERLAND AND LUKE, MARYLAND, AUGUST, 1967

Federal Water Pollution Control Administration
Annapolis, Maryland

April 1968

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BETWEEN

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FWPCA
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I. INTRODUCTION

The Chesapeake Field Station of the Middle Atlantic Region, Federal Water Pollution Control Administration, conducted an intensive survey of the North Branch Potomac River Basin between Bloomington and Cumberland, Maryland, during August 1967 (see Figure 1). The purpose of this survey was to aid in verifying the model DO and BOD parameters. The survey should also show the extent of any diurnal water quality fluctuations including the effects of mine drainage.

II. PROCEDURE

A. Sampling

All samples for chemical analysis were obtained by dipping a plastic container full of the shallow stream water. A quart cubitainer was then filled from the dipped sample and iced. A portion of the dipped sample was siphoned into a DO bottle until overflowing and fixed. A portion of the dipped sample was also used to measure the pH and temperature at the time of sampling. The iced samples were returned to the camper laboratory within two hours where the analyses were started immediately.

B. Chemical Analysis

1. Reference: Standard Methods for the Examination of Water and Wastewater, 12 ed., 1965.

Dissolved oxygen was determined by the azide modification of the basic Winkler method with the titration done potentiometrically with an automatic TITRALYZER.

2. Biochemical Oxygen Demand

Reference: Standard Methods for the Examination of Water and Wastewater, 12 ed., 1965.

The biochemical oxygen demand was determined by the azide modification of the basic Winkler method with the titration done potentiometrically with an automatic TITRALYZER. The samples, as received, were diluted if necessary and transferred to standard 300 ml BOD bottles in triplicate. One initial DO and two final

DO determinations were used throughout. Incubation was started immediately at 20°C and continued for five days after which they were titrated.

3. pH

The pH measurements were made at the sampling point with a field pH Meter.

4. Total Alkalinity

Reference: Standard Methods for the Examination of Water and Wastewater, 12 ed., 1965.

The total alkalinity was determined by titrating 100 ml, or suitable aliquot, to pH 4.5 with standardized 0.02 N sulfuric acid. A laboratory pH Meter was used to indicate pH changes.

5. Total Cold Acidity

Reference: Standard Methods for the Examination of Water and Wastewater, 12 ed., 1965.

The total cold acidity was determined by titrating 100 ml, or suitable aliquot, to pH 8.3 with standardized 0.02 N sodium hydroxide. A laboratory pH Meter was used to indicate pH changes.

III. STATION DESCRIPTIONS

Number	Station	Location
3	North Branch Potomac	Headwater of West Virginia Pulp and Paper Co., Luke Mill impoundment.
4	North Branch Potomac	Bridge between Luke, Md., and Piedmont, W. Va.
5	Georges Creek	Bridge in Westernport, Md.
6	North Branch Potomac	Off Md. Rt. 135, five miles east of Westernport High School.
7	North Branch Potomac	U. S. Rt. 220 Bridge between McCoole, Md., and Keyser, W. Va.
8	North Branch Potomac	Black Oak Bottom, east of Fort Hill off Md. Rt. 135
10	North Branch Potomac	Bridge between Pinto, Md., and Short Gap, W. Va.
11	North Branch Potomac	Cumberland Fair Ground
11 A	North Branch Potomac	Off U. S. Rt. 220 near Bowling Green, Md.
12	North Branch Potomac	Bridge on W. Va. Rt. 28 between Cumberland, Md., and Ridgeley, W. Va.

IV. SURVEY RESULTS

NORTH BRANCH POTOMAC RIVER

August 16-18, 1967

Sample Number	Date Sample Taken	Time Sample Taken	CFS Flow	BOD mg/l	DO mg/l	Alkalinity mg/l $CaCO_3$	Acidity mg/l $CaCO_3$	Temp °C	Field *pH
	Station 3	Headwater W. Va. Pulp and Paper Co., Luke Mill impoundment							
67081611	8-16	0830	102	1.08	8.69	-	74.93	18	3.4
21		1335		0.96	8.36	-	73.08	24.1	3.6
31		1730		0.70	7.62	-	69.38	26	4
41		2250		1.68	7.85	-	72.15	22	3.7
1711	8-17	0325	111	0.29	8.41	-	74.00	20	3.5
21		0830		0.88	8.84	-	75.85	19.5	6.5
31		1340		0.49	8.25	-	76.78	23	3.8
41		1825		0.65	7.78	-	75.85	24.5	3.5
51		2325		2.37	8.51	-	73.08	21.5	6.4
1811	8-18	0445	120	1.56	8.76	-	78.63	19	3.8
	Station 4	Bridge between Luke, Md. and Piedmont, W. Va.							
67081612	8-16	0850		19.52	2.81	2.27	16.65	32	5.7
22		1345		26.24	2.39	-	32.38	35.8	5.1
32		1745		27.20	1.58	22.71	00.925	33	6.3
42		2305		19.00	2.94	8.33	-	32	6
1712	8-17	0335		23.64	2.52	14.38	3.70	33.5	6.3
22		0845		21.16	3.26	14.38	2.31	29	6.4
32		1345		28.40	1.97	12.87	4.63	30	6.8
42		1835		25.64	2.42	7.57	4.63	31.5	6.7
52		2335		23.44	2.59	8.33	5.55	30	7.2
1812	8-18	0500		34.76	2.46	-	4.63	28	6.6

* Accuracy suspected due to faulty pH Meter

NORTH BRANCH POTOMAC RIVER (Continued)

Sample Number	Date Sample Taken	Time Sample Taken	CFS Flow	BOD mg/l	DO mg/l	Alkalinity mg/l $CaCO_3$	Acidity mg/l $CaCO_3$	Temp °C	Field *pH
	Station 5	Georges Creek - Bridge in Westernport, Md.							
67081613	8-16	0905		4.32	8.67	-	53.65	16.5	4.4
23		1400		4.24	7.89	-	53.65	23.5	4.6
33		1800		2.90	7.43	-	47.18	25	5.2
43		2315		3.46	7.76	-	47.18	20	4.2
1713	8-17	0350		0.78	8.34	-	51.80	17.5	6.2
23		0855		2.92	8.96	-	50.88	18	6.1
33		1400		3.70	8.18	-	55.50	22.5	4.4
43		1840		4.17	7.71	-	51.80	22.8	4.5
53		2340		2.74	8.23	-	37.93	20	6.6
1813	8-18	0515		2.04	8.48	-	50.83	27	4.5
	Station 6	Off Md. Rt. 135, 5 miles east of Westernport High School							
67081614	8-16	0920		8.90	2.22	21.95	10.18	22	6.6
24		1410		29.80	1.73	30.28	10.18	31.8	6.9
34		1815		12.12	2.50	37.85	6.48	31	5.9
44		2340		12.48	1.92	34.82	6.48	21.5	6.5
1714	8-17	0405		11.68	2.61	23.47	11.10	27.5	6.6
24		0905		10.36	2.47	32.55	9.25	27	6.1
34		1415		8.92	1.72	20.44	9.25	28	6.9
44		1850		8.44	3.42	22.71	6.48	29.9	6.9
54		2355		11.84	3.73	25.74	5.55	27	7.1
1814	8-18	0530		15.48	2.62	-	7.40	25	6.8

* Accuracy suspected due to faulty pH Meter

NORTH BRANCH POTOMAC RIVER (Continued)

Sample Number	Date Sample Taken	Time Sample Taken	CFS Flow	BOD mg/l	DO mg/l	Alkalinity mg/l $CaCO_3$	Acidity mg/l $CaCO_3$	Temp °C	Field *pH
	Station 7	U. S. Rt. 220 Bridge between McCoole, Md. and Keyser, W. Va.							
67081615	8-16	0940		5.88	5.32	28.01	7.40	24.5	6.8
25		1420		10.36	5.19	29.52	5.55	27.8	7.1
35		1830		7.12	4.50	28.77	5.55	28	6.6
45		2355		8.44	4.68	32.55	4.63	27	6.6
1715	8-17	0415		7.44	4.82	31.79	6.48	26.5	7.1
25		0925		7.20	5.24	32.55	7.40	26	6.7
35		1430		7.16	4.88	28.01	7.40	27	7
45		1900		8.12	4.69	25.74	4.63	29.5	7.1
55	8-18	0007		7.84	5.78	15.90	3.70	28	7.1
1815		0545		7.72	6.05	-	5.55	25	6.8
	Station 8	Black Oak Bottom, east of Fort Hill off Md. Rt. 135							
67081616	8-16	1025		4.18	8.29	28.77	3.70	24	6.7
26		1455		6.78	8.29	30.28	2.78	27.5	7.4
36		1850		5.42	7.06	34.07	2.78	26	7
46	8-17	0030		5.64	5.89	32.55	3.70	23.5	6.7
67081716		0445		5.04	6.06	32.55	3.70	23.5	6.4
26		0950		5.72	7.68	32.55	3.70	23	6.9
36		1500		4.98	8.89	31.79	0.925	27	7.4
46		1925		5.34	6.84	34.82	2.78	26	7.1
56	8-18	0035		6.76	6.63	37.09	3.70	24	7.1
1816		0610		5.50	7.04	-	3.70	22	6.8

* Accuracy suspected due to faulty pH Meter

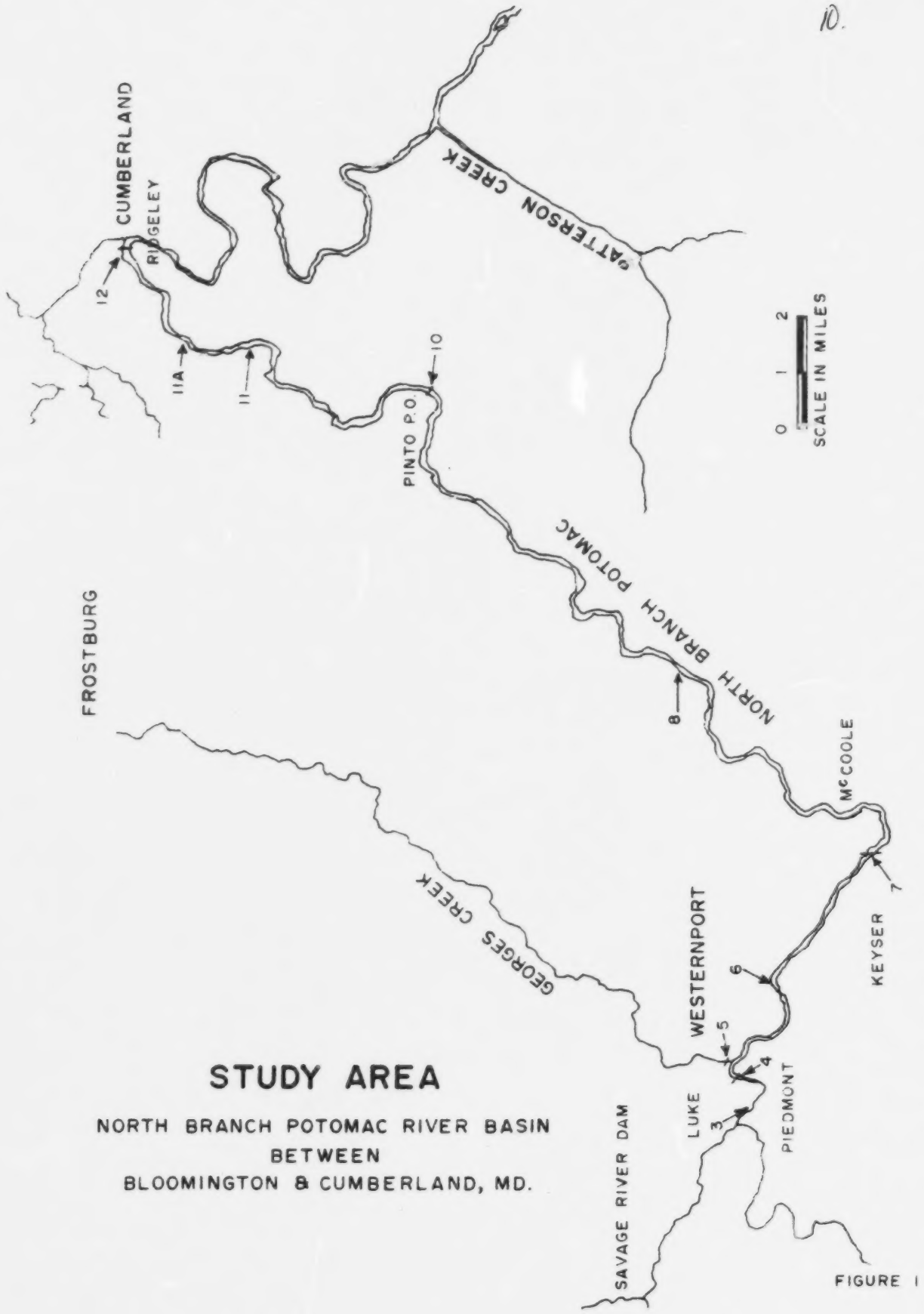
NORTH BRANCH POTOMAC RIVER (Continued)

Sample Number	Date Sample Taken	Time Sample Taken	CFS Flow	BOD mg/l	DO mg/l	Alkalinity mg/l $CaCO_3$	Acidity mg/l $CaCO_3$	Temp °C	Field *pH
	Station 10	Bridge between Pinto, Md. and Short Gap, W. Va.							
67081617	8-16	1055	115	2.88	6.81	21.95	4.63	22.5	6.8
27		1520		5.56	7.46	21.20	1.85	25.9	7.1
37		1915		5.68	8.50	24.22	2.78	21	7.3
47	8-17	0100	125	4.92	6.80	26.50	2.78	24	6.7
1717		0505		3.70	6.36	21.95	3.70	23.2	6.6
27		1015		9.86	6.96	29.52	3.70	23	7
37		1530		4.56	7.22	30.28	4.63	25	7.2
47		1945		3.60	6.90	31.79	3.70	25.5	7
57	8-18	0100	135	6.30	6.65	31.79	4.63	24	6.9
1817		0640		5.40	6.35	-	3.70	22	7
	Station 11	Cumberland Fair Ground							
67081618	8-16	1115		17.84	1.43	13.63	13.88	28	6.6
28		1535		25.04	0.77	15.14	12.03	30.5	6.7
38		1935		21.32	0.95	17.41	9.25	29	7.2
48	8-17	0125		16.80	1.04	15.90	10.18	25	6.4
1718		0530		16.52	0.65	14.38	12.03	27.9	6.7
28		1043		18.52	1.08	21.95	13.88	27	7
38		1545		16.60	0.77	30.28	6.48	30	7
48		2000		19.20	0.65	25.74	12.95	29	6.9
58	8-18	0115		16.20	1.06	28.77	12.95	27	7.1
1818		0700		16.76	1.74	-	4.63	27	6.9

* Accuracy suspected due to faulty pH Meter

Sample Number	Date Sample Taken	Time Sample Taken	CFS Flow	BOD mg/l	DO mg/l	Alkalinity mg/l $CaCO_3$	Acidity mg/l $CaCO_3$	Temp °C	Field *pH
	Station 11 A	Off U. S. Rt. 220 near Bowling Green, Md.							
67081619	8-16	1210		14.56	0.37	17.41	12.03	26.5	6.8
29		1545		15.28	1.35	15.14	8.33	28.6	6.8
39		1950		13.28	1.29	15.14	8.33	27	7.2
49	8-17	0200		13.52	0.40	18.93	8.33	25	6.4
1719		0545		10.08	0.42	18.93	8.33	26.1	6.2
29		1055		15.64	0.40	19.68	9.25	26.5	7.1
39		1600		10.88	0.35	23.47	10.18	29	7.2
49		2010		10.60	0.88	24.22	10.18	28.9	7.1
59	8-18	0130		16.28	0.61	27.25	12.03	26	6.9
1819		0725		10.52	0.33	-	7.40	26	6.8
	Station 12	Bridge on W. Va. Rt. 28 between Cumberland, Md. and Ridgeley, W. Va.							
67081620	8-16	1225	178	6.16	2.22	22.71	8.33	28.5	6.8
30		1610		8.96	0.40	21.20	6.48	31.5	6.8
40		2011		11.40	1.02	24.22	6.48	28	7
50	8-17	0210	160	13.94	0.29	24.22	9.25	25.5	6.5
1720		0555		12.18	0.45	23.47	11.10	28.1	6.7
30		1105		11.66	0.63	22.71	7.40	27	6.9
40		1615		10.80	0.22	20.44	11.10	31	7.3
50		2025		11.56	0.41	21.20	12.95	29.5	-
60	8-18	0145	180	14.32	0.31	21.95	9.25	29	6.9
1820		0740		11.68	0.39	-	12.03	27.5	7

* Accuracy suspected due to faulty pH Meter



STUDY AREA

NORTH BRANCH POTOMAC RIVER BASIN
BETWEEN
BLOOMINGTON & CUMBERLAND, MD.

FIGURE 1